

MONAI: An open-source framework for deep learning in healthcare

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Abstract

Artificial Intelligence (AI) is having a tremendous impact across most areas of science. Applications of AI in healthcare have the potential to improve our ability to detect, diagnose, prognose, and intervene on human disease. For AI models to be used clinically, they need to be made safe, reproducible and robust, and the underlying software framework must be aware of the particularities (e.g. geometry, physiology, physics) of medical data being processed. This work introduces MONAI, a freely available, community-supported, and consortium-led PyTorch-based framework for deep learning in healthcare. MONAI extends PyTorch to support medical data, with a particular focus on imaging, and provide purpose-specific AI model architectures, transformations and utilities that streamline the development and deployment of medical AI models. MONAI follows best practices for software-development, providing an easy-to-use, robust, well-documented, and well-tested software framework. MONAI preserves the simple, additive, and compositional approach of its underlying PyTorch libraries. MONAI is being used by and receiving contributions from research, clinical and industrial teams from around the world, who are pursuing applications spanning nearly every aspect of healthcare.